RESPONSE UNDER 37 CFR 1.116
EXPEDITED PROCEDURE
EXAMINING GROUP 1641

PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Nie et al.

Application No. 09/405,653

Art Unit: 1641

Filed: September 24, 1999

Examiner: C. Chin

For: WATER-SOLUBLE LUMINESCENT QUANTUM DOTS AND BIOMOLECULAR CONJUGATES THEREOF AND RELATED COMPOSITIONS AND METHODS OF USE

PENDING CLAIMS

1. A water-soluble luminescent semiconductor quantum dot, which comprises a core, a cap and a hydrophilic attachment group, wherein said hydrophilic attachment group is an organic group comprising a sulfur atom and at least one hydrophilic substituent selected from the group consisting of a sulfonic acid or salt thereof, a sulfamic acid or salt thereof, a quaternary ammonium salt, and a hydroxy, wherein the water-soluble luminescent semiconductor quantum dot remains in solution for at least one day.

2. The water-soluble luminescent semiconductor quantum dot of claim 1, wherein the hydrophilic attachment group is attached to said quantum dot via the sulfur atom.

5. The water-soluble luminescent semiconductor quantum dot of claim 1, wherein said organic group is a C_1-C_6 alkyl group or an aryl group.

6. The water-soluble luminescent semiconductor quantum dot of claim 1, wherein said organic group is a C_1-C_6 alkyl group.

7. The water-soluble luminescent semiconductor quantum dot of claim 1, wherein said hydrophilic attachment group is a thiol alcohol.

9. The water-soluble luminescent semiconductor quantum dot of claim 1, wherein the core of the quantum dot is selected from the group consisting of IIB-VIB semiconductors, IIIB-VB semiconductors, and IVB-IVB semiconductors and the size of the core is from about 1 nm to about 10 nm.

10. The water-soluble luminescent semiconductor quantum dot of claim 9, wherein the core of the quantum dot is selected from the group consisting of IIB-VIB semiconductors and the size of the core is from about 2 nm to about 5 nm.

11. The water-soluble luminescent semiconductor quantum dot of claim 10, wherein the core of the quantum dot is CdS or CdSe.

12. The water-soluble luminescent semiconductor quantum dot of claim 11, wherein the core of the quantum dot is CdSe.

13. The water-soluble luminescent semiconductor quantum dot of claim 12, wherein the size of the core is about 4.2 nm.

14. The water-soluble luminescent semiconductor quantum dot of claim 1, wherein the cap is selected from the group consisting of IIB-VIB semiconductors of high band gap.

15. The water-soluble luminescent semiconductor quantum dot of claim 14, wherein the cap is ZnS.

16. The water-soluble luminescent semiconductor quantum dot of claim 11, wherein the cap is ZnS.

17. The water-soluble luminescent semiconductor quantum dot of claim 14, wherein the cap is CdS.

18. The water-soluble luminescent quantum dot of claim 12, wherein the cap is CdS.

21. A composition comprising the water-soluble luminescent semiconductor quantum dot of claim 1 and an aqueous carrier.